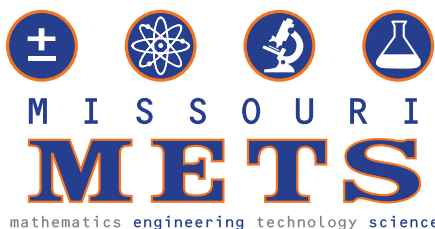
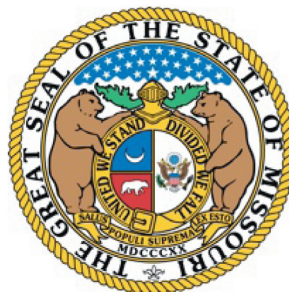

A Call to Action for Missouri

2006 GOVERNOR BLUNT'S
MATH AND SCIENCE SUMMIT



Introduction

On April 25, Missouri Governor Matt Blunt hosted a Math and Science Education Summit that brought together leaders from education, business, government and communities across the state. The purpose was to raise awareness and to recognize the challenges that Missouri will face in the coming years if more students are not fully prepared for careers that require knowledge and skills in mathematics, engineering, technology and science (the METS fields). This report summarizes the discussion at the Math and Science Summit and indicates the next steps Missouri needs to take to improve math and science education for all students across the state.

At the Summit, Governor Blunt stated his commitment to enhancing Missouri's success in global competition by expanding the METS skills of the State's current and future workforce, increasing the public awareness of this critical issue, supporting initiatives that will move Missouri forward, and increasing Missouri's involvement in developing new knowledge and translating it into world-class products and services. This initiative will require the support of State government, local government, public education systems, private education systems, higher education institutions and Missouri businesses. This summit was the first example of how this collaborative effort can begin the conversation and produce results.

Action as a result of the Summit is already under way. Governor Blunt appointed a Math and Science Alliance to begin taking on the suggested strategies outlined at the Summit. Secondly, a group to discuss a plan to develop a P-20 Data and Resource Center has begun to work together. Both groups will report back to the Governor by August 31, 2006. Third, an Internet site: <http://governor.mo.gov/mets/> will provide documents and the DVD of the Summit and updates on how the State is moving forward.

This report details the beginning of the conversation and the work that is now under way. Much more discussion and work will continue in the coming months and years to make Missouri a leading state in METS education.

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Preparing Missouri's Students for the Future

If one word could sum up what will be important in the 21st century, it might be innovation. The development of new technologies, products, and services are spurring progress in virtually every aspect of life. Parents joke about relying on their children to figure out how to use home computers and appliances, but we will soon rely on our children for much more than that—both to maintain the innovation and creativity that have fuelled our peace and prosperity and to solve the many problems that threaten it.

Computerized manufacturing processes, new software tools, high-tech medical devices and treatments, and many more innovations drive economic growth and enhance our quality of life. At the same time, innovation holds the key to meeting many of the urgent challenges facing both the nation and the state of Missouri—skyrocketing health care costs, a looming energy crisis, an aging transportation infrastructure, and a possible flu pandemic, just to name a few.

Continuing the pace of innovation, using technology wisely, and responding effectively to challenges will require not only a deep pool of technical talent but good policy and engaged citizens as well. The future of the state of Missouri and the nation will depend heavily on the effectiveness of education in mathematics, engineering, technology, and science (METS).

To ensure that Missouri succeeds in equipping its citizens with the METS-based knowledge and skills they need to prosper in a global economy, Governor Matt Blunt called 180 business, education, and government leaders from around the state to a Math and Science Summit on April 25, 2006. He framed the challenge in stark terms:

A very real crisis for educators, employers and, ultimately all of America, is the lack of knowledge and motivation in the areas of math and science. This challenge will continue to impede our ability to compete in the global marketplace.

The Summit was the first step in the Governor's plan to make Missouri a leader in math and science—known for the knowledge and expertise of its workforce and well equipped to compete in the global marketplace. A Summit planning committee, made up of educators at the K-12 and post-secondary levels, business leaders, and others with a stake in METS education, was charged by the governor to analyze Missouri's strengths, weaknesses, and opportunities with regard to METS education.

In preparation for the Summit, the planning committee commissioned a data book that documents the urgent need for action to improve METS education in Missouri (<http://governor.mo.gov/mets/>). The committee also identified four strategic challenges that will be key to improving METS education in Missouri:

1. Improve the performance of all students from pre-kindergarten through graduate education (P-20);
2. Expand the pool of students motivated to pursue METS careers;
3. Expand the pool of Missouri's P-12 METS teachers; and
4. Increase public awareness of the importance of METS-related industries and jobs in enhancing Missouri's competitiveness and innovation.

This report documents the results of the Summit and provides the grounding for the ongoing work of the Governor's newly appointed Math and Science Alliance, which is charged with turning the Summit's goals into concrete action.

What's the Challenge?

The first task for the Summit was to lay out clearly the nature of the problem facing Missouri—and its urgency. As the Governor explained:

We have let the status quo persist for too long and have allowed an entire generation of young people to graduate from high school—many of them unprepared through their education to be successful members of the workforce they enter—let alone the workforce of the future.

Summit speaker John Yochelson, of Building Engineering and Science Talent (BEST), who prepared the Summit Data Book, presented key indicators for Missouri and the nation, demonstrating both why METS education matters so much—and how both Missouri and the nation are falling short.

METS education is critical for the nation's success. The United States represents only 5% of the world's population but produces 20% of its economic output—and it is technological innovation that accounts for half of U.S. economic growth. But other countries are working hard to compete and are catching up—the U.S. share of the high-technology export market has been declining since 1990. While U.S. investment in research and development has increased only slightly since 1990, investment by competitors around the world has shot up in the last decade.

For the United States to continue to lead the world economically, its workers will need complex technical skills and the capacity to keep learning new ones. But U.S. students are earning proportionately fewer METS degrees in comparison with students in other countries. While the rate of METS bachelors degrees has remained relatively flat in the United States for two decades, China has tripled its higher education enrollment since 1998, and 45% of its undergraduates are majoring in METS fields. The share of foreign-born workers in scientific and technical jobs in the U.S. almost doubled between 1990 and 2000 and now comprises almost 25% of the nation's technical workforce. For Ph.D. holders, the increase was from just under 25% to more than 37% just in that decade.

K-12 education must provide the foundational skills that will enable our post-secondary system to produce a larger, better prepared METS workforce. Yet the nation lags there as well. International comparisons of math and science achievement show U.S. students scoring below average—and show their performance declining between 4th grade and 8th grade and still more by 12th grade. As a result, 22% of students enrolling in two- and four-year colleges require remediation in math, and many of these students fail to earn a degree.

Too few U.S. high school students are taking the challenging math and science programs routinely offered in many other countries, and too many are not learning to high levels. Moreover, it is not just average U.S. students who are lagging behind; even U.S. students enrolled in top-flight METS courses are outperformed by their peers in other countries. From the perspective of Summit presenter Bill Schmidt, of Michigan State University, the most striking contrast between the U.S. approach to METS education and the approaches of its economic rivals is in the way they organize what they teach. Mathematics and the sciences are formal disciplines with inherent, logical structures, he reminded the audience. Yet for students in most jurisdictions in the United States, including Missouri, math and the sciences are not presented in ways that are coherent with the structure of these disciplines.

Top Achieving Countries' Mathematics Curriculum

Topic	Grade							
	1	2	3	4	5	6	7	8
Whole Number: Meaning	■	■	■	■	■			
Whole Number: Operations	■	■	■	■	■			
Measurement Units	■	■	■	■	■	■	■	
Common Fractions			■	■	■	■		
Equations & Formulas			■	■	■	■	■	■
Data Representation & Analysis			■	■	■	■	■	■
2-D Geometry: Basics			■	■	■	■	■	■
2-D Geometry: Polygons & Circles			■	■	■	■	■	■
Measurement: Perimeter, Area & Volume			■	■	■	■	■	■
Rounding & Significant Figures			■	■	■	■	■	■
Estimating Computations			■	■	■	■	■	■
Whole Numbers: Properties of Operations			■	■	■	■	■	■
Estimating Quantity & Size			■	■	■	■	■	■
Decimal Fractions			■	■	■	■	■	■
Relation of Common & Decimal Fractions			■	■	■	■	■	■
Properties of Common & Decimal Fractions			■	■	■	■	■	■
Percentages			■	■	■	■	■	■
Proportionality Concepts			■	■	■	■	■	■
Proportionality Problems			■	■	■	■	■	■
2-D Geometry: Coordinate Geometry			■	■	■	■	■	■
Geometry: Transformations			■	■	■	■	■	■
Negative Numbers, Integers, & Their Properties			■	■	■	■	■	■
Number Theory			■	■	■	■	■	■
Exponents, Roots & Radicals			■	■	■	■	■	■
Exponents & Orders of Magnitude			■	■	■	■	■	■
Measurement: Estimation & Errors			■	■	■	■	■	■
Constructions Using Straightedge & Compass			■	■	■	■	■	■
3-D Geometry			■	■	■	■	■	■
Geometry: Congruence & Similarity			■	■	■	■	■	■
Rational Numbers & Their Properties			■	■	■	■	■	■
Patterns, Relations & Functions			■	■	■	■	■	■
Proportionality: Slope & Trigonometry			■	■	■	■	■	■

The countries that perform at the highest levels in math and science have curricula that proceed in an orderly way, as shown above. By contrast, the curricula in the United States are, quite literally, all over the map, and are often not taught in a coherent or rigorous manner.

The teaching of math and science in the United States lacks coherence (a logical structure that derives from the inherent structure of the discipline), lacks focus (adequate exposure to a topic when it is first presented so it can be learned properly), and lacks rigor (cognitive complexity). It is these characteristics that led Schmidt to coin the description of American math and science curricula as “a mile wide and an inch deep.” American students are presented with watered-down versions of math and science concepts over and over again as they progress through school—never quite mastering them because they are disconnected from broader conceptual frameworks and not taught in a rigorous way. In short, the nation as a whole is failing to provide its young people with the METS education they need to sustain our economic leadership.

METS education is critical for individual Missourians’ success. Parents and students may not always see the relevance of the nation’s economic success to their own lives. Yet a grounding in math and science is a necessary foundation for success in higher education, and METS literacy is also needed for life beyond formal education, regardless of how long an individual stays in school. The workplace is changing rapidly; Missouri workers need sophisticated skills to succeed in a global economy in which computers and other complex technology are used everywhere from farms and factories to auto repair shops, stores, and dental offices. Workers without the skills to use this technology are likely to be trapped in the lowest paying jobs.

Individuals also need METS literacy to make sense of life’s daily functions and challenges. Making informed decisions about public and civic issues, making purchases and other financial decisions, and comprehending social problems, for example, all require skills and knowledge developed in METS coursework. METS education provides a basic building block for success in adulthood—a tool for personal and civic responsibility and success in the workforce.

Yet Missouri students are lagging behind. The state’s 4th graders rank in the bottom third on national math assessments, and its 8th graders rank below those in 34 other states in math aptitude. Performance consistently drops sharply for Missouri students between the 4th and 8th grades on the Missouri Assessment of Progress (MAP), with fewer than one-fifth of students in the upper grades scoring at grade level in math and science. While Missouri has pockets of excellence—including schools that serve high-poverty populations—the state also has a significant achievement gap, with far fewer of its minority students performing at proficient—or even basic—levels than their non-minority peers.

This state of affairs is a disservice to Missouri students and will not serve the state well as it attempts to compete in a global economy.

METS education is critical for Missouri's economic success. Missouri is well-positioned to compete nationally and internationally for business in agriculture, advanced manufacturing, life sciences, health care, and information services—all sectors that rely on METS. Because of its central location, Missouri is within 500 miles of significant markets for retail sales, service industries, and manufacturing establishments. METS creates a huge economic multiplier for the state. Although professionals with technical degrees account for only 8% of Missouri's total workforce, high technology-based economic activity accounts for three-quarters of the \$10.6 billion in products and services exported by Missouri in 2005. Life science-related employers alone employ 183,000 Missourians. METS-based industries are key to the state's economic growth, with high-technology firms accounting for a quarter of all new businesses.

METS skills are key to earning power in Missouri. Recent METS graduates earn more than their non-METS peers, on average, and high-technology businesses pay far more than other employers. Average wages in high-technology industries are roughly twice those for all other industries, while average wages in the most sophisticated, high-technology industries are nearly three times those for all industries.

Summit participants brought home the point that METS-based skills and knowledge are critical to the state's capacity to continue to grow and thrive. Business and education leaders from across the state noted the difficulty of finding employees with the skills they require. Missouri is not producing enough new engineers to replace its current workforce, which is aging. For example, one-fourth of the Boeing Corporation's 6,000 St. Louis engineers are already eligible for retirement. Demand for graduate level employees at high-tech firms in Missouri requires nationwide searches.

Higher skills are needed at all levels. A packaging company executive reported that applicants for entry-level jobs are routinely frightened off by the basic skills test the company requires and frequently leave without even taking it. Businesses that may not sound high-tech—such as farming or office supply—still require a variety of technical expertise. Yet even for jobs that require only a two-year degree, particularly in the life sciences, national recruitment is often necessary because not enough Missourians are qualified. Many Missouri employers rely on foreign-born employees, and thus see high turnover in the most hard-to-fill jobs, as these workers take their skills home to U.S. rivals with fast-growing opportunities.

Missouri is making efforts to foster METS-related economic activity—its universities attract substantial investment in research and development, for example—but it is not yet on a par with other states. Missouri’s academic research and development is not yielding new businesses at rates found in other regions, and the dollar value of its research enterprise is smaller than those of Ohio, Michigan, and Illinois. Thirty-four states rank ahead of Missouri in the share of their gross state product devoted to research and development.

The bottom line from the perspective of the leaders at the Summit was that Missouri badly needs a greater supply of college graduates ready for METS-based careers, and that it also needs to do a better job with METS education for all of its citizens. All graduates of Missouri schools need to be in a position to consider a range of careers and need to be equipped with the critical thinking and analytical skills to succeed in whatever career they choose.

What Can Missouri Do?

Missouri takes its responsibility for K-12 education seriously. The state spent \$7.7 billion—32% of its total revenue—on public education in 2003-04 and spends more per student than 22 other states. Missouri recently passed legislation to establish a P-20 Council. This council is charged with ensuring that the state provides a seamless education. That means coursework and expectations at all levels are articulated with what content comes before and after each level. The state also recently increased its graduation requirements—and now requires three credits both in science and math.

But this is not enough. Missouri lags behind other states in METS education, in student achievement, in preparation for college and work, and in the rigor of its graduation requirements. As Summit participant Deborah Patterson, of Monsanto Fund, pointed out, competing with mediocrity won’t get Missouri very far. Missouri could become a state in which all students are held to high achievement standards, are provided with the resources and instruction they need to learn, and meet ambitious goals for their achievement. Few would argue against this goal, but what would it look like in Missouri?

The leaders at the Summit stressed two points above all: first, Missouri is facing not just a problem but a crisis in METS education; and second, a systemic response is required—no patchwork or bandaid approach will suffice. The primary tool Missouri has to address this situation is its academic standards. It is through explicit, rigorous standards that Missouri can require that its students be taught math and science through a coherent, focused, and rigorous approach. But advocating strong standards is not enough. Leaders in Missouri will need to collaborate to make change happen.

Tackling the Strategic Challenges

The second key task for Summit participants was to identify specific ways to turn the strategic challenges into action—feasible ideas likely to have a real impact on METS education. What follows is the result of these deliberations.

1. Improve the Performance of all P-20 Students

Participants repeatedly stressed the importance of systemic change, of considering the entire education pipeline, not just focusing on critical stages such as the high school years. The pre-school, K-12 and post-secondary systems are completely interdependent, so fixing one problem without addressing the whole picture will yield no lasting benefit. A coherent, focused, rigorous curriculum and means of holding students to high expectations were deemed critical. At the same time, however, participants saw several more issues as needing immediate attention as well: teacher quality, time on task, and resources.

Systemic change: The need for a unified, comprehensive approach to reforming METS education was evident to all. Missouri students need to enter kindergarten ready to learn math and science, and they need to be on track to succeed in algebra by 8th grade. Their high school courses need to prepare them to succeed in post-secondary education without remediation, and to learn high-tech applications on the job. Uniform statewide standards that cover preschool through higher education are the critical reference point that can make this articulation a reality.

Students, parents, educators, and policy makers all need consistent feedback about the state of the system and the progress being made. A well-organized and coordinated system for collecting necessary data and making it readily accessible would be a valuable addition to Missouri's system.

Curriculum: Curricula are where standards become a reality, and Summit participants found Schmidt's presentation very persuasive. Many called for further strengthening of Missouri's graduation requirements to specify not only rigorous course requirements, but also the content those courses should cover. Participants want to see a common math sequence statewide. For example, expanded Advanced Placement courses and dual enrollment opportunities are effective ways to provide students with opportunities for challenging coursework. This is especially true in districts and schools that lack the resources to provide enough high-level coursework. Participants also want to see METS education incorporate real-world applications, data, and situations, so that students can see the relevance of what they are learning.

Set Higher Expectations: The declines in test scores as students get older, both in Missouri and in the United States as a whole, are evidence that no lack of capability can account for students' lackluster performance. If performance declines between 4th and 8th grade, it is the education system that is failing, not the students. Missouri students can be held to higher expectations, and the first step is to eliminate low-level, dead-end courses. Requiring algebra for all students by 8th grade is a first step.

Assessment is another critical piece of the puzzle. Requiring high school exit exams that set a high standard is a strategy many states use to ensure that districts are preparing students adequately, and that could be considered in Missouri. Participants also asked whether Missouri's MAP assessments are achieving desired goals. Just as content and performance standards should be derived from the disciplines themselves, assessments must effectively measure what's truly important in math and science in order to provide meaningful information about how well students are achieving.

Educators can be held to higher expectations as well. While some jurisdictions have tied teacher and administrator pay to student test scores, other methods could be considered as well. Requiring a school district to pay for remedial classes their students take once they enroll in college, for example, could help focus their attention on what they need to do to prepare students better.

More Time: Providing more instructional time for math and science is another common sense approach and there are a number of ways it could be done. The school day and school year could both be lengthened to allow more time, but other time can be used as well. After-school, summer, and other extracurricular time could be real learning opportunities for many students, particularly those who are struggling. These are also ideal opportunities for educational experiences that take place outside the classroom—perhaps in a working lab or a manufacturing plant—and engage students in real-world applications of math and science.

Improve teacher quality: To be successful, METS teachers need not only strong content knowledge, but also the pedagogical skills to help students learn in developmentally appropriate ways. Pre-service and professional development are critical to improving teacher quality, and many argued that much stronger and more rigorous math and science content need to be integral to both. Elementary school teachers, in particular, often receive minimal preparation in these areas. METS professionals, particularly from the higher education sector, could be recruited to help provide this content. But most important, Missouri needs to make a long-term, coordinated commitment to developing the quality of current and aspiring math and science teachers.

Provide schools and districts with resources: Finally, educators need resources—not just more money—to support their efforts. Regional support centers could provide assistance with curriculum development, assessment, and professional development, as well as access to technology, laboratory space, and equipment, and the like in an efficient way. Mobile laboratories could bring the opportunity to engage in hands-on science to schools that can't afford it on their own. Technology such as distance learning can also help schools, particularly in underserved and remote areas, improve the opportunities they can offer. Every student should have access to master teachers, even if they are not physically present on campus. Business resources and partnerships between businesses and local districts and schools can also bridge some gaps between schools' resources and students' needs.

2. Expand the Pool of Students Motivated to Pursue METS Careers

Improving METS achievement will not by itself address Missouri's need. The state needs not only successful students, but also talented and well prepared students who enter METS professions and succeed in them. Summit participants' strategies for making this goal a reality focused on supporting students at each stage, celebrating their successes, and making the appeal of METS careers more evident to them.

Career education and counseling: One key to getting more students motivated to pursue METS careers is to reach them early. Students need to understand how important math, science, and technology are, and also experience ways that these courses and math and science careers are truly accessible to them. Students need to understand how their math and science studies relate to many different career pathways—not just those that require four-year or advanced degrees, but others that may require a two-year degree or just some advanced coursework. Counseling can help students identify their interests and choose course patterns that will allow them to meet their goals, but counselors need training to provide this kind of targeted guidance. Structures such as career academies, through which students learn about a range of options related to their interests and strengths and have many opportunities to see real-world applications could provide big benefits in this area. Finally, minorities and female students, who are underrepresented in METS careers, need to be supported in thoughtful ways.

Expose kids to real-world applications: Opportunities for students to see how many ways there will be for them to use and apply what they learn in METS classes is critical for capturing their attention and sustaining their interest and motivation. Businesses—and other places where workers use METS—can play a very important role in providing these opportunities through mentoring programs, internships, job shadowing, and other ways of showing students the world of work. Informal learning institutions such as museums and zoos can do the same and can also offer engaging learning opportunities explicitly linked to the

curriculum in a neighborhood school. Any of these organizations could adopt a school or form a partnership with a district to spread the word, share resources, and provide opportunities.

Celebrate and reward METS achievement: Achievement in METS courses and activities ought to be celebrated as vigorously as sports and other achievements. For example, Science Olympiads, hosting national events such as the Intel competition, and other high-profile METS related activities for students at all levels can help spread the message that science and math are “cool.”

Incentives: Everyone responds to incentives. States that have faced shortages of nurses have used financial incentives such as scholarships, tuition breaks, and low-cost student loans to attract students to nursing programs and motivate them to apply their skills where they are needed most. Options such as these, energetic recruitment like that routinely done by business and the military, and early decision options for METS undergraduate programs can all attract talented students and encourage them to consider METS careers.

Supports and resources: Challenging METS coursework can be daunting if students are not supported when they struggle. Any student might need some one-on-one tutoring on occasion, or other kinds of support and guidance. Too many students drop out after the first year in METS undergraduate programs. If trained faculty and/or counselors monitored their progress and intervened with needed supports, many of these students could be retained. Project Lead the Way is one model for engaging and supporting students who might be interested in engineering (as well as addressing the need for more engineers in a systemic way). Missouri could expand this program at both the middle and high school levels.

3. Expand the Pool of Missouri's P-12 METS Teachers

Qualified METS teachers are in short supply, but without them Missouri students cannot meet the Summit goals. The knowledge and skills required for the job are high, and many teachers who have the requisite abilities leave the job after only a few years. Summit participants' strategies for addressing this urgent need focused on identifying new sources of teachers and teaching support, and on ways to make the job more appealing to prospective and current METS teachers.

Consider new sources of high-quality teachers: Missouri has a shortage of METS teachers, but there are a variety of ways to supplement the current teaching force. Alternative or provisional certification for professionals from METS fields is a well-known way of encouraging people with valuable expertise to teach. Adjunct and part-time appointments, as are used in higher education, and teaching stints for METS professionals on sabbatical from their positions, are other nontraditional structures that open the door to retired teachers, corporate employees, and others.

Professionals such as these, as well as master teachers, could also serve as math and science “specialists,” who function in the same way that art and music specialists do in elementary schools: rotating to all classrooms in a school to teach students one subject while providing the home-room teacher time for planning. Alternatively, math and science coaches, similar to the literacy coaches found in many schools, could work with classroom teachers and students to enhance METS learning.

Financial Incentives: Teachers’ salaries are not competitive with the salaries in METS fields, and are low by any standard, considering the preparation and dedication the job requires. Thus, the law of supply and demand suggests that METS teachers will remain in short supply, by comparison with other teachers. Raising salaries—perhaps changing the salary schedule so that METS teachers can be paid more than teachers in other fields—is an option many participants believe has to be considered. Other financial incentives, made conditional on a commitment to remain on the job for a certain period and/or to teach in high-need areas, could help as well, including loan forgiveness, property tax incentives, low-cost education loans, and the like. Providing ways for teachers to supplement a base salary while enhancing their skills, such as coaching other teachers or participating in paid summer internships could also help encourage teachers.

Other Incentives: The status and working conditions for teachers are not currently an incentive to enter or remain in the profession. A number of changes could significantly improve working conditions for teachers without undue expense. First, opportunities to collaborate with colleagues, to keep up with research developments, and to build skills through professional development activities closely linked to what is happening in classrooms, are very limited by class and school year schedules. New models for the school day or the school year, ways to relieve teachers of duties that could be performed by others, and support from part-time co-teachers, perhaps drawn from business, could give teachers much more flexibility to engage with their profession in the ways other professionals typically do. Improved facilities and resources (labs, equipment, computers, and so on) can also make teachers’ jobs easier and more enjoyable and improve children’s learning.

4. Increase Public Awareness of the Importance of METS Knowledge in Enhancing Missouri's Global Competitiveness and Innovation

Raising public awareness of the importance of METS knowledge, though last on the list, was widely recognized as key to making Missouri's effort a success. The strategies for raising public awareness are straightforward; it is the sustained focus and the skill with which they are executed that will determine their impact on outcomes for Missouri schools and students.

Need a Leader: Many participants argued that an effective public awareness campaign will require a leader dedicated to this issue, perhaps a high-visibility personality charged specifically by the Governor with making it happen.

Public Awareness Campaign: Also needed, however, would be a professional public relations firm that could develop a concrete plan, a slogan, and a logo. Simple, clear ways of telling the story of Missouri's many METS successes (through a website, advertisements, billboards, etc.) are needed. The individual stories of Missouri scientists, mathematicians, business leaders, and other role models can help make the excitement of math and science real for parents, students, and other citizens. Depictions of what is going on with science and technology around the nation and the world can help bring home the importance of getting and staying competitive. An important element of this campaign will be to educate Missouri journalists about the importance of METS education so they will begin to cover it as a serious issue.

Outreach: Apart from a public relations campaign, Missouri will need a coordinated, grassroots outreach effort. Local school boards, parents, and local business and civic leaders can all help make sure the message is heard everywhere it is needed. Training for school board members, business leaders, and others willing to make presentations, placement of articles in school and local publications, and the like, are all ways that local leaders can coordinate with the statewide public awareness campaign.

Next Steps

The Summit focused much needed attention on the gaps in METS education in Missouri. Governor Blunt demonstrated how seriously he sees the issue by announcing the formation a Math and Science Alliance, which will present a report to the Governor by August 31, 2006, detailing reforms the state must make.

The Math and Science Alliance is charged not with weighing a host of possibilities, but with devising a plan to zero in on what Missouri can do right away. The Alliance is asked to meet five objectives:

1. Review the four strategic challenges and prioritize them;
2. Provide recommendations based on these suggestions that include partnerships between all sectors: business, government, preschool, K-12, and higher education;
3. Develop an action plan with measurable outcomes and list measurements for assessing progress;
4. Determine which entity(ies) will be tasked with accomplishing provisions in the plan; and
5. Identify funding sources for supporting each objective.

The Alliance membership includes leaders from K-12 and post-secondary education, as well as from business and other civic organizations. The group has an ambitious charge and an ambitious timetable for delivering to the Governor a plan for making Missouri a global leader in METS education.

Missouri must think strategically. The state already spends a lot of money on education. But, as Summit speaker and former federal Under Secretary of Education Eugene Hickock noted, it's not just spending that matters, but investment. Missouri needs to expend its resources wisely in a coordinated strategy for improving METS education. The sectors most concerned with education—business, policymakers, and educators—will need to increase their focus on collaboration to make such a coordinated strategy work. If the elements of the improvement strategy are well-designed, they will work together, build on one another, and yield real results for Missouri and its citizens.